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(54) IMPROVED FRAMEWORK MEMBERS

(71) I, CYRIL SLOGGETT, a British Subject, of Upper Shaw Farm House, Shaw, Nr. Purton, Swindon, Wiltshire, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed to be particularly described in the following statement:—

This invention relates to improved framework members of a type which may readily be joined together to form a framework which may then be readily disassembled for storage purposes.

Frameworks which are simply erected and readily disassembled can be used for a variety of purposes, and many such framework systems are well known. All such systems strive for simplicity in construction and manner of fixing the framework members together, while at the same time providing a versatile system by which many different framework may be assembled.

It is the main object of this invention to provide a framework system which reconciles the above two qualities, and at the same time does so in an economic manner.

According to the present invention there is provided a framework member for forming frameworks, comprising an elongate member of angle cross-section having first and second arms, a longitudinally extending part-circular recess between the inwardly facing surfaces of the arms at the junction thereof adapted to interlock with a complementary part of a further framework member, and the inwardly facing surface of each arm having a longitudinally extending groove or rib which is spaced outwardly from the adjacent side edge of the recess.

The invention also includes the combination of at least two framework members as aforesaid with a corner member having two or three arms disposed mutually at an angle to each other, each said arm having a portion thereof adapted to receive or be

received in the projection or longitudinally extending recess of a framework member.

In order more particularly to illustrate the invention, several embodiments thereof will now be described, by way of example only, and with reference to the accompanying drawings, in which:—

FIGURE 1 is a cross-sectional view of a framework member constructed in accordance with the invention;

FIGURE 2 is a perspective view of a corner member and three framework members in accordance with the invention, showing how the three framework members in accordance with Figure 1 may be attached to the corner member;

FIGURE 3 is a perspective view of the assembled corner of Figure 2;

FIGURE 4 is a perspective view of an alternative joint using the corner member of Figure 1 with T-section framework members;

FIGURE 5 is a cross-sectional view of an alternative section framework member and two corner members;

FIGURE 6 is a cross-sectional view of a further section framework member and four corner members;

FIGURE 7 is a perspective view of another section framework member constructed in accordance with the invention;

FIGURE 8 is a perspective view of yet another section framework member constructed according to the invention;

FIGURE 9 is a cross-sectional view of a further framework member constructed in accordance with the invention;

FIGURE 10 is a plan view of a further corner member constructed in accordance with the invention;

FIGURE 11 is an end view of the corner member of Figure 10;

FIGURE 12 is a cross-sectional view through a cover member for use with a framework member in accordance with the

invention;

FIGURE 13 is a cross-sectional view through an alternative form of framework member in accordance with the invention;

5 FIGURE 14 is a cross-sectional view through two framework members in accordance with Figure 9 showing how these may be attached together;

10 FIGURE 15 is a cross-sectional view through two framework members in accordance with Figure 9 showing how these may be attached together at an angle by a bracket;

15 FIGURE 16 is a cross-sectional view through two framework members in accordance with Figure 13 showing how these may be attached together to form a channel unit by means of a bracket;

20 FIGURE 17 is a cross-sectional view through four framework members in accordance with Figure 9 showing how these may be attached together;

FIGURES 18 to 25 are cross-sectional views showing how a basic framework member in accordance with Figure 9 may be utilised for joining or holding other framework members in the fabrication of a framework;

30 FIGURE 26 is a cross-sectional view showing how several framework members in accordance with Figure 9 and other framework members may be utilised to form a pivoted door structure; and

35 FIGURE 27 is a cross-sectional view showing how several framework members in accordance with Figure 9 and other framework members may be utilised to form a sliding and folding door structure.

Referring first to Figure 1 which illustrates a basic construction of framework member according to the invention, this is preferably extruded in aluminium although other metal or plastics may be used. It will be seen that the framework member, generally indicated at 1, is L-shaped in cross-section, having a first arm 2 and a second arm 3 with outwardly facing flat surfaces 4 and 5 respectively.

Inwardly facing surfaces 10 and 11 of the arms 2 and 3 respectively are each provided with two longitudinally extending recesses 12 and 13, the recesses 12 being undercut so as to be of dovetail form and the recesses 13 being provided with longitudinally extending serrations on the opposed walls thereof. At the junction of the inwardly facing surfaces 10 and 11 there is provided a part-circular longitudinally extending recess 14.

60 Referring now to Figure 2 which illustrates a corner member for use with framework members as illustrated in Figure 1, the corner member, generally indicated at 15, is formed of aluminium or other rigid material and has three arms 16, 17 and 18

disposed mutually at right-angles to each other. Each of the arms 16 and 17 carries a block 19 and 20 respectively which has a part-circular portion 21 and 22 respectively and a flange 23 and 24 respectively. 70 The blocks 19 and 20 are provided with screw-threaded holes 25 and 26 for the reception of set screws inserted from the inside of the respective arms.

The arms 16 and 17 are also provided 75 with undercut projections 27 and 28 respectively. The arm 18 is provided with a screw-threaded hole 31 for the reception of a third set screw. The third arm 18 is part-circular as indicated at 32. 80

It will be readily apparent to one skilled in the art as to how the three framework members in accordance with Figure 1 are joined together to form a corner by a corner member in accordance with Figure 2. As indicated in Figures 2 and 3, the ends of the framework members are mitred and one such framework member 1a is moved into sliding engagement with the corner member by the part-circular portion 32 of arm 18 engaging within the part-circular recess 14, the undercut projections 27, 28 engaging within longitudinal recesses 12. 90

A second framework member 1b engages arm 16, sliding along the part-circular portion 21, and a third framework member 1c engages arm 17, sliding along the part-circular portion 20. 95

Tightening of the set screws in holes 25, 26 and 31 will retain the framework members 1a, 1b, and 1c and the corner member 15 in their relative positions as illustrated in Figure 3 until such time as the framework should be disassembled when it is a simple matter to unscrew the set screws 105 and collapse the assembly.

Instead of there being three arms on a corner member 15, only two such arms may be provided. One such arm must be the arm 18 which is capable of engagement along 110 the entire length of an associated framework member and one of the other arms 16 or 17. Thus, this type of corner member would join two framework members.

Referring now to Figure 4, a corner member 15 is similar to that of Figure 2 for joining three framework members 33a, 33b and 33c each of T-shaped cross-section. It will be appreciated that this T-shaped framework member is, in effect, two L-shaped framework members arranged back-to-back as an integral whole. The joining together of the members will be apparent from the previous description. 120

Figure 5 illustrates a Z-shaped framework member 34 which, in effect, is two L-shaped framework members arranged back to back with the two free arms not lying in the same plane as in the Figure 4 embodiment. Two corner members 15 are also 130

shown.

Figure 6 illustrates a X-shaped framework member 35 which, in effect, is two T-shaped members or four L-shaped members arranged back-to-back. Four corner members 15 are also shown.

Figures 7 and 8 illustrate that with an L-shaped framework member, the arms need not be at a right angle to each other but may be at an acute angle (Figure 7) or an obtuse angle (Figure 8).

It will be appreciated that the corner members can be used to form the corners of rectangular frameworks at all the corners thereof. It should also be appreciated that the angle between the arms of the corner members may not be right angles, although this is preferable.

A further framework member in accordance with the invention is shown in Fig. 9. It will be seen that the framework member generally indicated at 36 is L-shaped in cross-section having a first arm 37 and a second arm 38 with outwardly facing surfaces 39 and 40 respectively. These outwardly facing surfaces 39 and 40 are complementary in that surface 39 is provided with two recesses 41, the outer walls 42 of which are undercut for the reception of longitudinally extending projections 43, the outer walls 44 of which are undercut.

The inwardly facing surfaces 45 and 46 of the arms 37 and 38 respectively are each provided with two longitudinally extending recesses 47 and 48, the recesses 47 being undercut, and the recesses 48 being provided with longitudinally extending serrations on the opposed walls thereof. At the junction of the inwardly facing surfaces 45 and 46 there is provided a part-circular longitudinally extending recess 49.

Referring now to Figures 10 and 11 which illustrate a corner member for use with framework members as illustrated in Figure 9, the corner member, which is similar to that of Figure 2, is generally indicated at 50 and is formed of aluminium or other material and has three arms 51, 52 and 53 disposed mutually at right angles to each other. Each of the arms 51 and 52 carries a block 54 and 55 respectively which has a part-circular portion 56 and 57 respectively, and a flange 58 and 59 respectively. The blocks 54 and 55 are provided with screw-threaded holes 60 and 61 for the reception of set screws.

The arms 51 and 52 are also provided with undercut projections 62 and 63 respectively, and further projections 64 and 65 respectively. The arm 53 is provided with a screw-threaded hole 66 for the reception of a third set screw.

The third arm 53 is part-circular as indicated at 67.

To assemble the framework, the ends of

three of the framework members of Figure 9 are mitred. One such framework member is moved into sliding engagement with the corner member by the part-circular portion 67 of arm 53 engaging within the part-circular recess 49, the undercut projections 62 and 63 engaging within longitudinal recesses 47, and projections 64 and 65 engaging within longitudinal recesses 48.

A second framework member engages arm 51 by the part-circular portion 56 engaging within part-circular recess 49 and the flange 58 engaging within recess 48. Similarly, with arm 52 the part-circular portion 57 engages within part-circular recess 49 and the flange 59 engages within recess 48.

Tightening of the set screws will retain the framework members and the corner member in their relative positions until such time as the framework should be disassembled when it is a simple matter to unscrew the set screws and collapse the framework.

Instead of there being three arms on a corner member only two such arms may be provided. One such arm must be the arm 53 which is capable of engagement along the entire length of an associated framework member and one of the other arms 51 or 52. Thus, this type of corner member joins two framework members.

It will be appreciated that the corner members can be used to form the corners of rectangular frameworks at all the corners thereof.

Referring now to Figure 14 which shows two framework members very similar in construction to the framework member of Figure 9 joined together in back-to-back relation. These framework members of Figure 14 differ from that of Figure 9 only in that the outer surfaces of the arms either have a single recess or a single projection, whereas there were two recesses and two projections in the embodiment of Figure 9. It will be seen from Figure 14 that the framework members 68 and 69 are joined back-to-back by the longitudinally extending projection 70 on framework member 68 engaging in and being retained by the recess 71 in framework member 69.

Figure 17 is an extension of the manner of fixing framework members together as illustrated in Figure 14, and shows four framework members 72, 73, 74 and 75 joined together in back-to-back relation by the longitudinally extending ridges on each member engaging in a longitudinally extending recess in an adjacent member. Thus, the projections 76 engage in recesses 77.

An alternative embodiment of framework member is illustrated in Figure 13, and again is preferably formed by extruding aluminium. The framework member 78 includes two arms 79 and 80, the outer sur-

faces of which have a longitudinally extending ridge 81 and a longitudinally extending recess 82 respectively. The inwardly facing surfaces of the two arms 79 and 80 are provided with two longitudinally extending recesses, in this case an undercut recess 83, and in the arm 80 an enlarged recess 84, but in the arm 79 a recess 85 which leads to a longitudinally extending slot 86 within the arm 79. At the junction of the two arms 79 and 80 is provided a part-circular recess 87.

Figure 15 illustrates the manner in which two framework members constructed in accordance with Figure 14 may be attached together at an angle by the use of an intermediate member 88. Two framework members 89 and 90 are joined together by the intermediate member 88 by a longitudinally extending ridge 91 on the intermediate member 88 engaging with the longitudinally extending recess 92 in the framework member 90. The intermediate member 88 is provided with two longitudinally extending and undercut projections 93 at the longitudinally extending edges thereof which engage within the undercut recesses 94 in the framework member 89.

Figure 16 shows a further way in which two framework members 95 and 96 may be attached together, this time to form a U-shaped channel section, and these two framework members are attached together by means of a backing plate 97 having two longitudinally extending recesses 98 which receive the longitudinally extending ridges 99 of the framework members 95 and 96.

A cover member is illustrated in Figure 12 and simply consists of an L-shaped extrusion 100 in aluminium having two arms 101 and 102 with longitudinally extending clip members 103 and 104 projecting from their free longitudinal edges. These clip members 103 and 104 are received in the undercut recesses 47 if the cover is to be used in conjunction with a framework member of Figure 9. The arrangement is such that the cover member 100 is a snap fit within a framework member 36 and adds to the rigidity and load bearing capability of the structure.

In Figure 18, a framework member 105 is illustrated having fixed thereto by means of one or more screws 106 a different form of cover member 107. The longitudinal edges of the cover member 107 are received within recesses 108.

In Figure 19 a framework member 109 acts as a locating member for two partitions 110 which are further located by two bracket members 111 and 112 held together by a screw 113.

In Figure 20 a framework member 114 retains the edges of panels 115 by these edges being passed into retaining strips 116

which engage within the longitudinal recesses 117 in the framework member 114, and these two retaining members are held in place by two V-shaped strips 118 being urged together by a screw 119.

Figure 21 is an arrangement similar to that of Figure 19 but with the clips holding thicker panel members 120. In this construction a framework member 121 acts as a corner strip to locate the panels 120 which are further located by the clips 122 and 123 being urged together by means of screw 124.

Figure 22 is an arrangement somewhat similar to that of Figure 20 but with only one panel 125 being retained within strip 126 which itself is retained in framework member 127. A make-up piece 128 is provided, and the make-up piece 128 and the strip 126 are retained in position by V-shaped pieces 129 being urged together by screw 130.

Figure 23 shows how a framework member 131 may be used to form the corner edging for locating two panels 132, the edges of which are further located by V-shaped members 133 urged together by screw 134.

In the embodiment shown in Figure 24 a framework member 135 acts as the corner piece for joining two panels 136 and 137 by the use of a bracket 138 which enters into the recesses 139 in the framework member, and a V-member 140 joined to the bracket 138 by a screw 141. The outside of the framework member 135 is covered by two facia members 142, one of which is provided with the longitudinally extending ridge 143 which engages within the longitudinally extending recess 144 in the framework member 135, whereas in the other facia member the longitudinally extending ridge 145 of the framework member 135 engages within the recess 146 of the facia member.

In Figure 25 a further framework member 147 is illustrated forming the end of one edge of a panel 148 joined thereto by the use of a make-up member 149, and two part V-pieces 150 joined together by a screw 151.

Figure 26 shows a door construction with a hinge 152. The door is built up of four framework members 153, two of which are shown in the Figure, having disposed between them a door panel 154 with sealing members 155. The upright of the door may again comprise a framework member 156 which carries the hinge 152, and the door post may comprise another framework member 157.

Figure 27 illustrates how a folding door may be fabricated from framework members in accordance with the invention, in which two central framework members 158

and 159 are connected by a hinge 160, the framework member 158 being connected by a panel 161 to another framework member 162, in turn connected by a hinge 163 to another framework member 164. The free end panel of the folding door may include a further framework member 165 connected to its other framework member 159 by a panel 166. The framework member 165 may have a sliding bearing 167 running in a track 168 which may or may not be part of a framework member.

Very many other constructions of auxiliary framework members may be utilised with the basic member in accordance with the invention as illustrated in Figures 1 and 9 for the formation of all types of frameworks. It should be appreciated that the members of the invention enable joints to be established at any distance along the length of a given framework member.

Frameworks constructed in accordance with the invention and from members in accordance with the invention may find many different applications, for example, in consumer durables which includes furniture, occasional furniture, shower enclosures, television stands, hi-fi stands, trolleys, shelf units, book cases; secondary building products which includes hinged doors, sliding doors, folding doors all with or without frames, partitioning, patio doors, cleanrooms, hot houses, sheds, home extensions, garages; commercial products which includes office desks, tables, cupboards, library furniture, display frames and counters, shop fitments, refrigerated display counters, exhibition stands, computer hardware consoles, electronic equipment cases, assembly benches, laboratory furniture; primary building products which includes curtain walling, windows, partable and demountable buildings, structural building systems, i.e. framed-up combinations of floor, wall and roof members; and toys such as building kits and wendy houses.

WHAT I CLAIM IS:—

1. A framework member for forming frameworks, comprising an elongate member of angle cross-section having first and second arms, a longitudinally extending part-circular recess between the inwardly facing surfaces of the arms at the junction thereof adapted to interlock with a complementary part of a further framework member, and the inwardly facing surface of each arm having a longitudinally extending groove or rib which is spaced outwardly from the adjacent side edge of the recess.

2. A framework member as claimed in Claim 1, in which the or at least one of the recesses in the inwardly facing surfaces of the arms is undercut.

3. A framework member as claimed in Claim 1, in which the inwardly facing surface of each arm is provided with an undercut longitudinally extending recess.

4. A framework member as claimed in Claim 3, in which located between the part-circular recess and the undercut recess in each arm is a parallel sided longitudinally extending recess.

5. A framework member as claimed in Claim 4, in which the parallel sided recesses are each provided with longitudinally extending serrations on the opposed walls thereof.

6. A framework member as claimed in any one of the preceding claims, in which the elongate member of angle cross-section is L-shaped or T-shaped or Z-shaped or X-shaped.

7. A framework member as claimed in any one of Claims 1 to 5, in which the elongate member of angle cross-section is L-shaped having first and second arms, the outwardly facing surfaces of which are complementary, whereby the first arm of one such member may be engaged with and thereby retain the second arm of another similar such member with the complementary surfaces abutting.

The combination of at least two framework members as claimed in any one of the preceding claims with a corner member having two or three arms disposed mutually at an angle to each other, each said arm having a portion thereof adapted to receive or be received in the projection or longitudinally extending recess of a framework member.

9. The combination as claimed in Claim 8, in which one of said arm portions of the corner member is capable of sliding engagement along the entire length of an associated framework member.

10. The combination as claimed in either Claim 8 or Claim 9, in which each arm of the corner member has at least one projection for entry into a longitudinally extending recess on the inwardly facing arms of the framework members.

11. The combination as claimed in any one of Claims 8 to 10, in which each said arm of the corner member is provided with a set screw for locking the relevant framework member to its associated arm of the corner member.

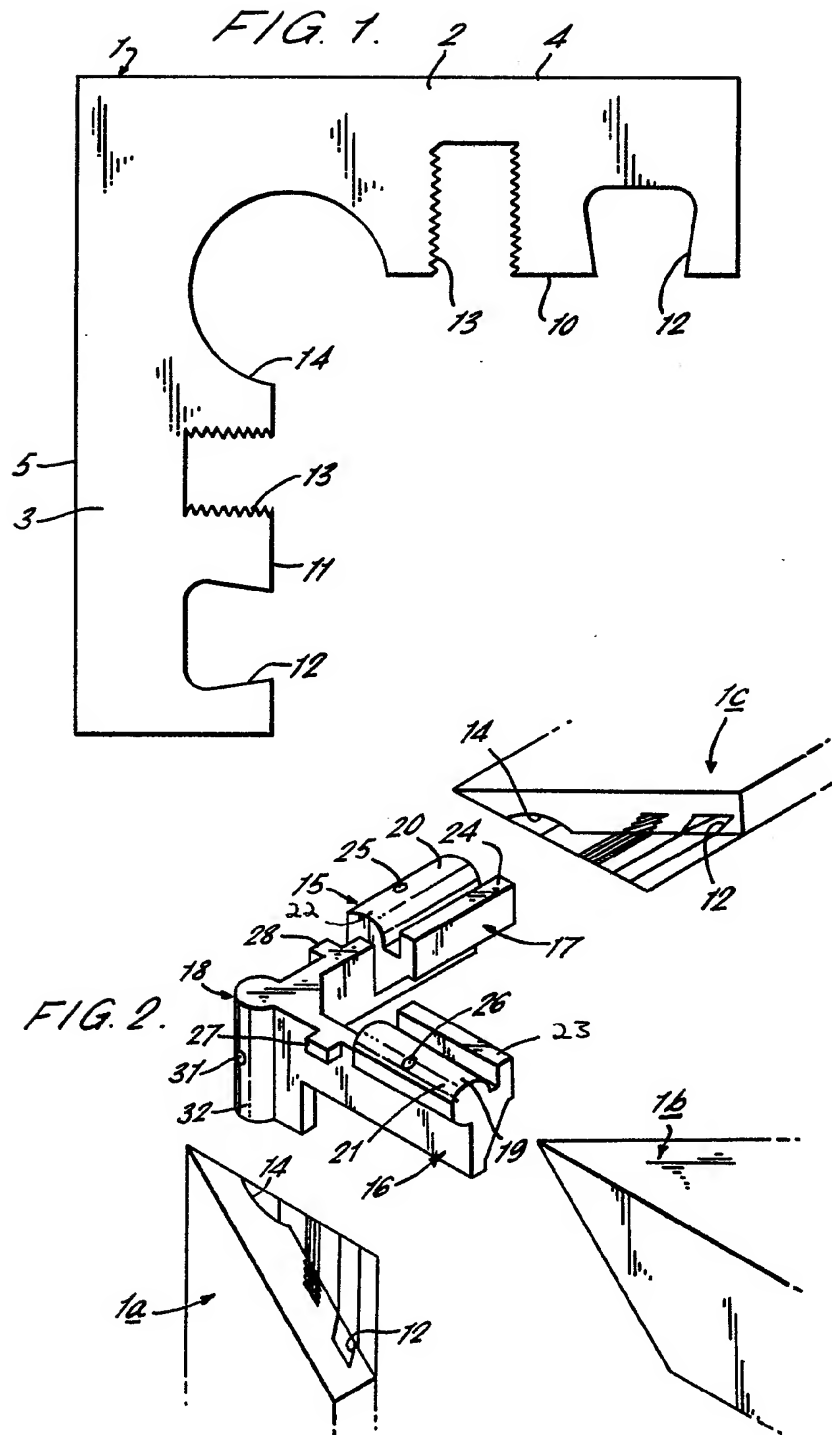
12. The combination as claimed in any one of Claims 8 to 11, in which the arms of the corner member are disposed mutually at right angles to each other.

13. The combination as claimed in any one of Claims 8 to 12, in which an end portion of each said framework member is mitred to form a corner with the or each end portion or portions of the other framework member or members.

14. A framework member for forming frameworks substantially as herein described with reference to Figures 1, 4, 5, 6, 7, 8, 9, 13 or 14 of the accompanying drawings. in described with reference to Figures 2 or 10 and 11 of the accompanying drawings. 10
- 5 drawings.
15. The combination of at least two framework members as claimed in Claim 14 with a corner member substantially as here-

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10 SHEETS

COMPLETE SPECIFICATION

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SHEET 2

FIG. 3.

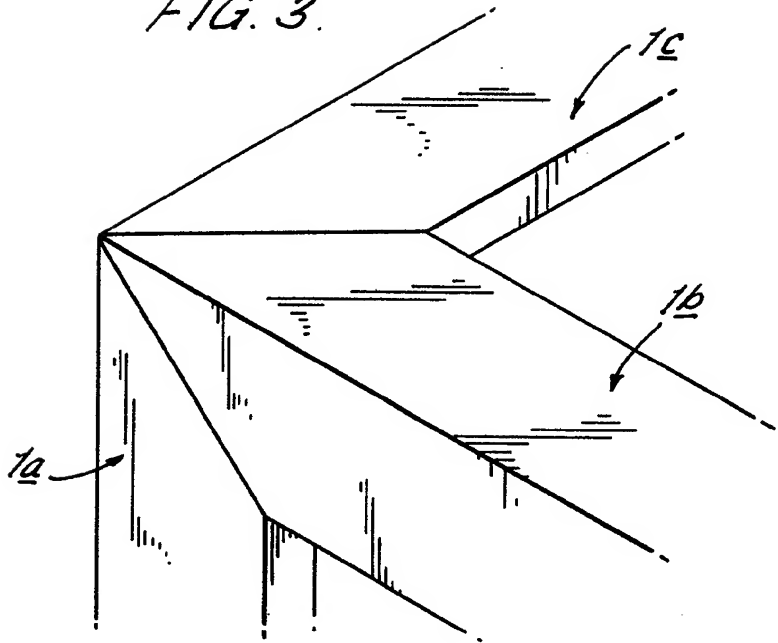
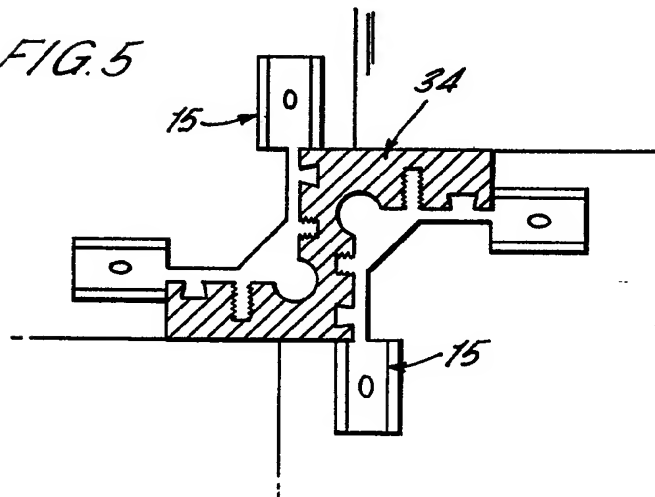


FIG. 5



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COMPLETE SPECIFICATION

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SHEET 3

FIG. 4.

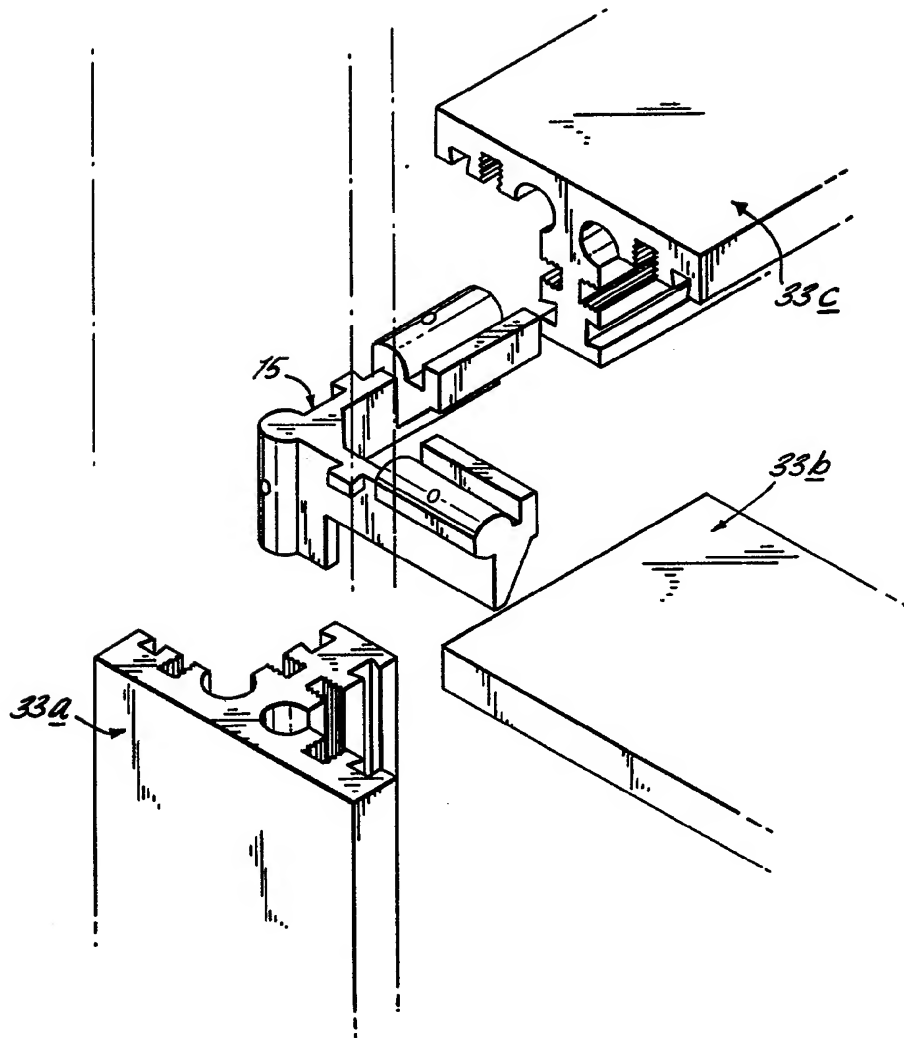


FIG. 6.

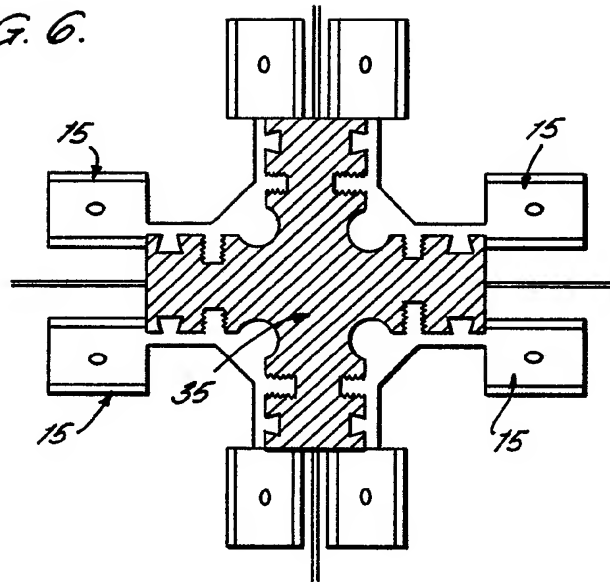


FIG. 7.

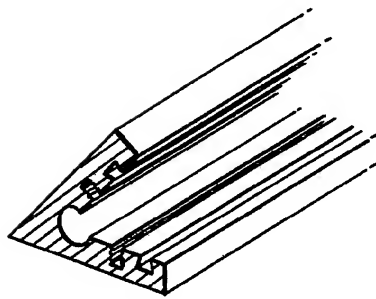
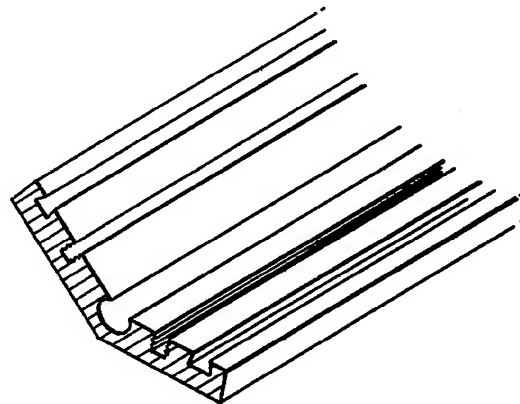


FIG. 8.



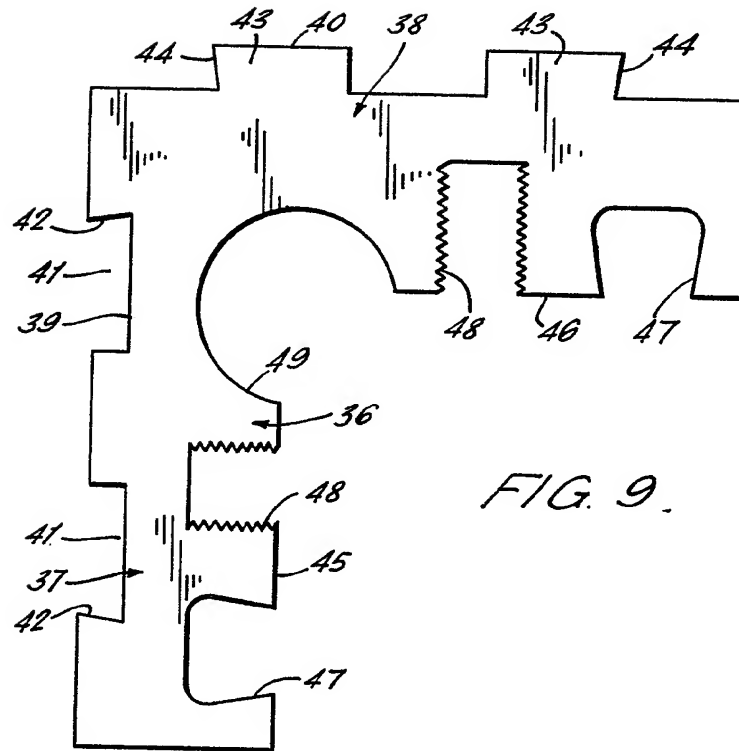


FIG. 9.

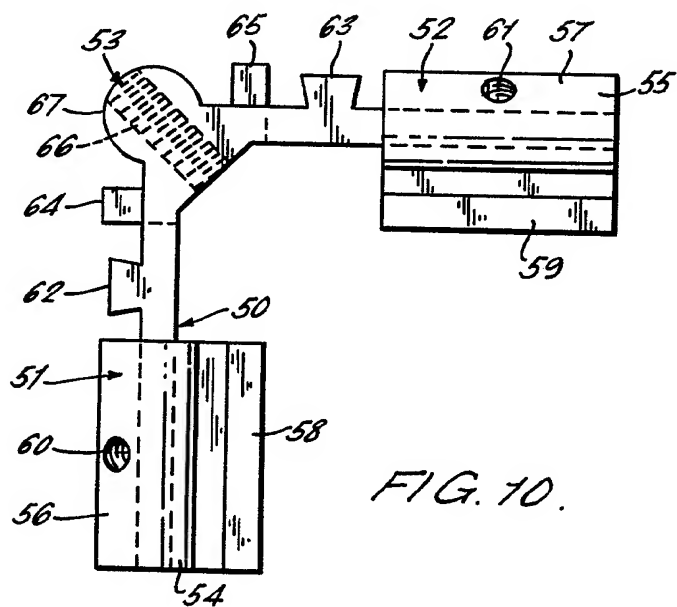


FIG. 10.

FIG. 11.

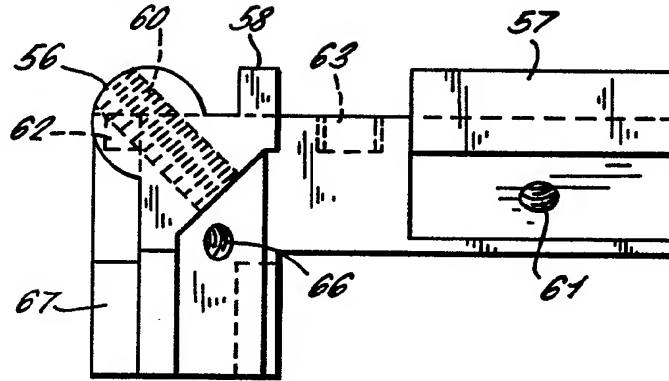


FIG. 12.

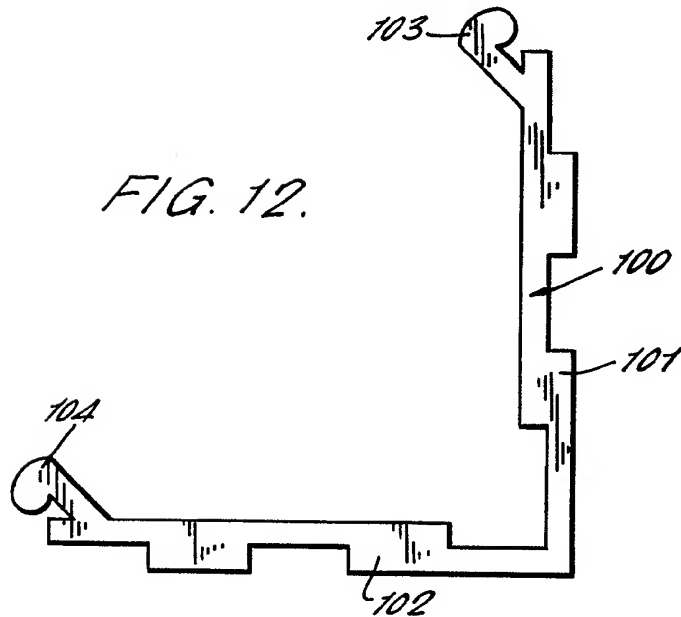


FIG. 13.

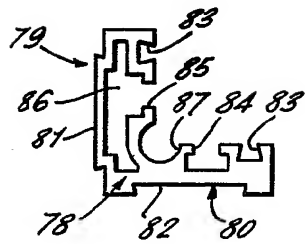


FIG. 15.

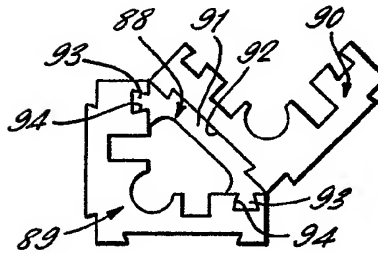


FIG. 14.

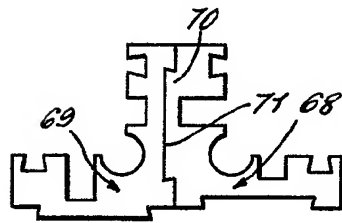


FIG. 16.

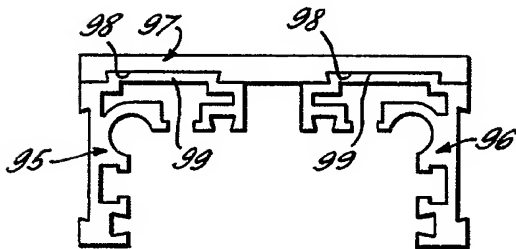


FIG. 17.

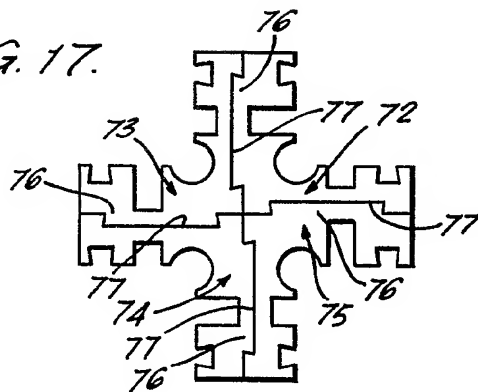


FIG. 18.

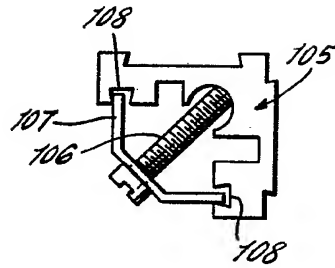


FIG. 19.

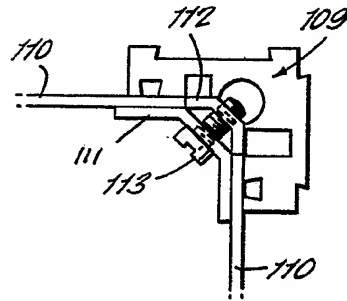


FIG. 20.

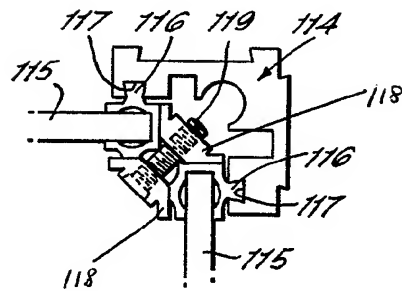


FIG. 21.

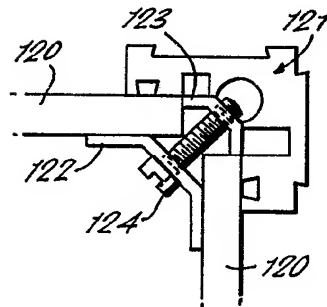


FIG. 22.

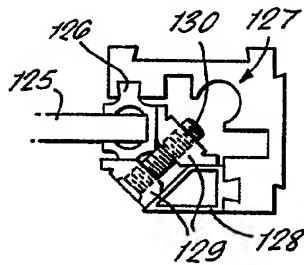


FIG. 23.

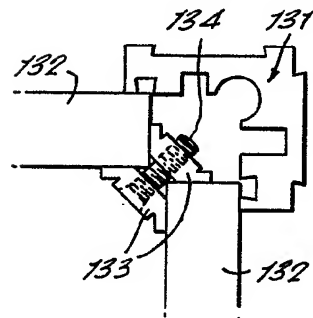


FIG. 26.

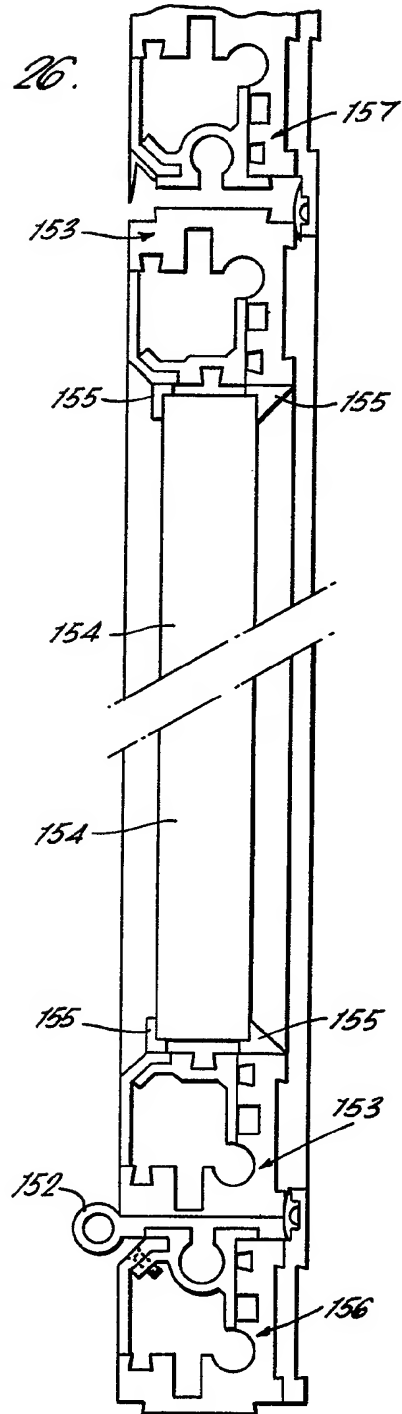


FIG. 24.

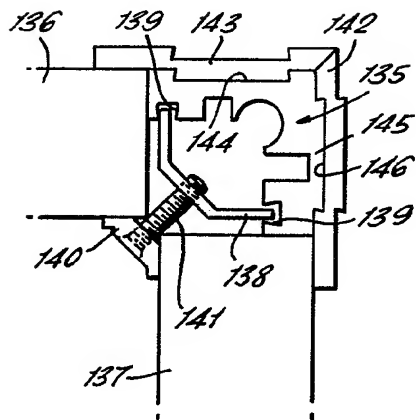


FIG. 25.

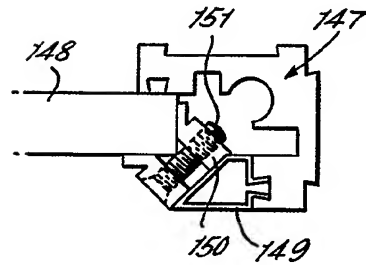


FIG. 27.

